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editing and arranging, for Dr. Stainer, a new chant-book for use in St. Paul's Cathedral.

Towards the close of his short life Robert Callcott became deeply interested in Astronomy. Next to music it was his chief study, and his great delight was to deliver popular lectures on the subject. Almost his last act was to purchase the Observatory of the late Canon Chevallier, but he did not live to see it removed from the rectory at Heighington.

He was buried in the picturesque little churchyard of Bray, near Maidenhead.

He was elected a Fellow of this Society June 13, 1884.

JOHN BENJAMIN DANCER was born in London on October 8, 1812. In 1818 his father, Mr. Josiah Dancer, removed to Liverpool, where he carried on the business of an optician and philosophical instrument maker. His son very early in life evinced a strong taste for mechanical and scientific pursuits, and when the father died, in 1835, he was able to carry on the business.

After a few years Mr. Dancer removed to Manchester, where he became well known through his numerous inventions and improvements of philosophical instruments. Among these may be mentioned photographic slides for the magic lantern, which were first suggested by him; the introduction of earthenware porous jars in voltaic batteries, the preparation of microphotographs, improvements in the stereoscope, and the production of a new thermometer described by Dr. Joule as "the first made in England with any pretension to accuracy."

With regard to Mr. Dancer's connection with the microscope, it would be difficult to overestimate the stimulus he gave to microscopy in Manchester by bringing out successively several forms of instruments as excellent in their mechanical and optical arrangements as they were moderate in price.

Some few years ago his sight began to fail, and in a short time he became totally blind, and with this affliction his business declined; and it is sad to record that one who had rendered such valuable service to science should have ended his days, on November 24, 1887, in very straitened circumstances.

Mr. Dancer's active mind never lost its interest in the studies and discoveries of his earlier years. By his numerous friends his society was to the last highly appreciated, and his modest and kindly disposition greatly enhanced the pleasure and advantage of his conversation. His simple-minded devotion to every branch of physics was not less remarkable than his unfailing industry, and the inventive genius by which it was directed to results of no ordinary importance to the mechanician and the lover of natural science.

He was elected a Fellow of this Society March 9, 1855.

THOMAS GASKIN was born at Penrith, in Cumberland, on May 12, 1810. He was educated at Sedbergh School, and in

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early life showed exceptional grasp of learning and assiduity of habits. As a boy he displayed a remarkable memory, and on leaving school it is said that he could repeat above twenty Greek plays by heart.

The encouraging promise thus afforded by his boyhood was afterwards realised by a career at Cambridge of exceptional brilliancy. In 1827 he entered St. John's College, where he was always placed first in the college examinations. In 1831 he took his degree as Second Wrangler, Earnshaw being the Senior Wrangler. He was also second Smith's Prizeman.

Subsequently on no less than six occasions he held the office of Moderator, which at that time was unique. Among the Senior Wranglers he examined were Leslie Ellis, Cayley, Todhunter, and Ferrers, and among his colleagues as Moderator were Stokes and Cayley. He was elected Fellow of Jesus College, and was for some years tutor of that college.

In the opinion of his contemporaries at Cambridge Mr. Gaskin was almost unrivalled for his skill in the construction and solution of difficult Senate House problems. In 1847 he published two volumes containing solutions of geometrical problems and of trigonometrical problems set in St. John's College. The problems are comparatively elementary, but his methods of solution are always interesting and excellent, and many of the processes show surprising ingenuity. They exercised an appreciable influence on the teaching of the University.

In 1852 he published a tract of 84 pages upon the geometrical construction of a conic section subject to five conditions of passing through given points and touching given straight lines. The constructions were deduced by the method of anharmonic ratio which at that time was a comparative novelty.

The appendices of his *Geometrical Problems* and his papers on conic sections, published in the *Mechanics' Magazine* for 1848, also bear testimony to his mastery of geometrical processes and skill in their development.

It is impossible to examine Mr. Gaskin's writings without failing to see that he was a mathematician of rare power, and that what he accomplished was greatly inferior to what might have been produced by one gifted with such ability if he had devoted himself to the advance of mathematical science. For example, in the problem paper set by him in the Tripos of 1839 there are several questions, including one on Probabilities and one on Riccati's equation, which might fitly have borne more ample treatment as mathematical investigations of permanent value. But he seems to have confined himself to the work of the University, and mathematical science has failed to include among her higher workers one who was probably capable of enlarging her boundaries.

With mathematical attainments of the highest order, Mr. Gaskin combined a remarkable classical knowledge, and it was considered that if he had devoted himself to classics he would have become as eminent in literature as in science.

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For many years he remained at Cambridge. After vacating his Fellowship by marriage he resided for a short time at Grantchester, near Cambridge, whence he removed to Cheltenham, where the last thirty-two years of his life were spent.

For many years before his death, owing to ill health, he was unable to devote his time to work. He died 1887, March 31.

Mr. Gaskin was a Fellow of the Royal Society, having been elected 1839, March 21.

He was elected a Fellow of this Society 1836, November 11.

Peter Gray was born in Aberdeen about the year 1807. His parents were not in affluent circumstances, but they were enabled to give their children a tolerably good education. Mr. Gray was educated at Gordon's Hospital, where he early developed signs of considerable mental power. His success there won for him the distinction of being one of the six pupils annually nominated by the Hospital to receive tuition at Marischal College. Here he devoted much of his energies to mathematics, but he also had a taste for mechanics, and while quite a young man he devoted himself to grinding lenses.

Mr. Gray appears to have begun business as a bookseller, but before leaving Aberdeen he was induced to take up the pursuit of wood engraving, which he assiduously pursued for a time, and in which he attained a certain proficiency; but all this time he had not settled down to any occupation or profession for life. His letters and papers in the *Mechanics' Magazine* on mathematical subjects, especially relating to actuarial science, made his name known; and in 1842, soon after his first contributions appeared, he came to London and accepted a position in the establishment of Messrs. Samuel Courtauld & Co.

About this time his mathematical talent developed itself, and led to his being taken in hand by the late Professor De Morgan, who showed much interest in his writings and gave him valuable assistance in many ways. While scrupulously attending to the duties of his office in the daytime, he had always leisure in the evening to devote to his mathematical researches. Actuarial science had always the chief fascination for him, and in 1849 he published an important volume of tables and formulæ for the computation of life contingencies, to which an addendum was subsequently published in 1870. The primary object of these tables is to afford the means of determining the logarithm of the sum and difference of two numbers whose logarithms are known, the numbers themselves being unknown. The problem is therefore given log. a and log. b, find log. $(a \pm b)$ by the taking out of only one logarithm. The idea and first formation of tables for this purpose are due to Gauss, but Mr. Gray was the first to perceive their utility in the calculation of life contingencies, and to him is due their introduction as well as the calculation of the necessary tables. They are throughout original calculations, and in their construction the author recalculated a